

REMARKS

Applicants respectfully request reconsideration of the above-captioned application. Claims 1-15 are currently pending. As an initial matter, Applicants traversed the Restriction Requirement of March 12, 2003, insofar as two new claims 12 and 13 were added which carefully tracked the language of device claims 1 and 2. As pointed out, under MPEP §806.05, these claims should at least be concurrently examined with the device claims. Since method claims are being examined, it is respectfully submitted, again, that all of the method claims 3-13 should be concurrently examined as well. Accordingly, withdrawal of the restriction requirement is respectfully requested.

The Office Action includes an objection to the drawings under 35 U.S.C. §1.83(a) suggesting that the resistor layer should be shown both below, and below and above, the cathode layer in order to meet the recitations of claim 2, for instance. Figures 2A and 2B are proposed to be added to comply with the Examiner's suggestion. Naturally, there is sufficient support for these new drawings from the written description such as found in original claim 2 and page 2, lines 14 and 15. Acceptance of these new figures is respectfully requested.

The Office Action includes an objection to the specification noting several grammatical errors and some reference number errors. Each of the suggested changes has been made, as well as some others. Accordingly, withdrawal of the objection to the written description is respectfully requested.

The Office Action also includes an objection to claim 2 noting an error in tense in the language thereof. Claim 2 has been adjusted accordingly to reflect its original meaning as would be understood by those skilled in the art in reading the specification.

The Office Action includes a rejection of claim 1 under 35 U.S.C. §102(e) as allegedly being anticipated by the Nakamoto patent (U.S. Patent No. 6,097,138) and rejection of claim 2 under 35 U.S.C. §103(a) under 35 U.S.C. § 103 as allegedly being unpatentable over the Nakamoto patent in view of the Itoh et al. patent (U.S. Patent No. 5,892,321). These rejections are respectfully traversed.

The Nakamoto patent discloses a field emission cold-cathode which includes the formation of nanotubes or fullerenes as electron emitting elements. See column 5, lines 1-41, for instance. A carbon nanotube layer, for instance nanotube layer 26 shown in Figure 3a, is patterned by lithography in accordance with the layout of emitter 14. Each of the emitters being made of a plurality of carbon nanotubes 16 on a cathode interconnecting layer 116. Instead of carbon nanotubes, fullerenes can be used as disclosed, for instance at column 9, lines 44 *et seq.* With particular note of Figure 16 as inferentially described at column 13, each emitter 115 has a conductive projection 118 made of a portion of a conductive material layer 116 and a plurality of carbon nanotubes 122 partially buried in the tip of the conductive projection 118.

The use of fullerenes and carbon nanotubes is not the same thing as recited in the pending claims. It is respectfully submitted that the Nakamoto patent does not teach or anticipate the presently recited invention.

The present invention is a field emission device (FED) as described in various locations such as line 16-20 of page 4. The present invention has a configuration which includes a micro-tip 150 as a collection of a number of nano-tips and has nano-sized surface features. This means that a large amount of electrons can be emitted from the micro-tip even at a low voltage. This further means the FED has a high emission current density with low gate voltages thereby lowering power consumption. The microtip is provided nano-sized surface features by coating a carbonaceous polymer onto the micro-tips and etching the carbonaceous polymer until it results in the original smooth surface of the micro-tip changing into a surface with nano-sized features such as shown in Figure 2.

Hence, with this in mind it is respectfully submitted that the Nakamoto patent does not meet the claim recitations. Either one can view the carbon nanotubes of the Nakamoto patent as nano-tips having nano-size surface features, or the composite of the nano-tube and the conductive projection as an object having nano-size surface features, but it would not constitute a micro-tip *per se*. In other words, not all of the claim recitations can be simultaneously met.

Realizing that the Examiner may not be satisfied with reliance upon the claim language regarding micro-tips and nano-size surface features, claim 1 is amended to recite that the micro-tips have nano-size surface features wherein each micro-tip is homogeneous material. Support for this recitation can be found at various locations in the specification including pages 4, lines 6-8.

Additionally, Applicants have added new claims 14 and 15 which are essentially product-by-process claims. "The structure implied by the process steps should be

considered when accessing the patentability of the product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is named, or the manufacturing process steps would be expected to impart distinctive structural characteristics to a final product." See MPEP §2113 citing *In re Garnero*, 412 F.2d 276, 279, 162 USPQ 121, 123 (CCPA 1979).

Applicants have reviewed the Itoh et al. patent and note that it does not, nor it is asserted to, supply the teachings missing as identified above.

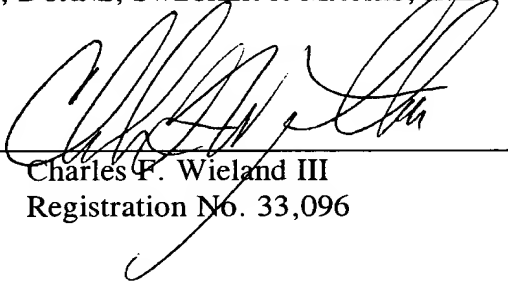
In light of the foregoing, Applicants respectfully request reconsideration and allowance of the above-captioned application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

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By: _____


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